Remarks

Issue I. The 102(e) rejection against claim 12 is improper because the Winniczek reference fails to disclose at least one element of claim 12.

It is well established that an "anticipating" reference must describe all of the elements and limitations of the claim in a single reference, and enable one of skill in the field of the invention to make and use the claimed invention.[1]

Applicants respectfully submit that the anticipation rejection against claim 12 is improper because the Winniczek reference fails to disclose all elements of limitation in claim 12.

Claim 12 describes a method of endpoint detection in plasma etching of a target layer of material. The method comprises the following steps:

1. measuring voltage across a plasma system by measuring a voltage across an element that is external to said plasma system;
2. detecting a change of the voltage prior to the completion of the etching of the target layer of material; and
3. stopping etch when the voltage decreases a predetermined amount within a predetermined time.

The Winniczek reference discloses a method and apparatus for determining an etch endpoint in a plasma processing system. The following embodiments are disclosed in the reference:

> In one embodiment, the endpointing arrangement includes a current monitoring circuit configured to monitor the current flowing to a pole of the electrostatic chuck to detect a pattern indicative of *the end of the etch process*. Upon ascertaining the pattern indicative of *the end of the etch process* in the current signal, a control signal is produced to terminate the etch.
>
> In another embodiment, the chuck represents a bipolar electrostatic chuck and currents flowing to both poles of the electrostatic chucks are monitored for the aforementioned pattern indicative of *the end of the etch*

[1] Merck & Co. v. Teva Pharms. USA, Inc., 347 F.3d 1367, 2003 (Fed. Cir. 2003).

> *process* in order to terminate the etch. In yet another embodiment, the differential of the currents supplied to the poles of the electrostatic chuck is monitored for the aforementioned pattern indicative of *the end of the etch process* in order to terminate the etch.
>
> In yet another embodiment, the electrostatic power supply includes a bias compensation power supply, which monitors currents supplied to the electrostatic chuck poles and outputs a compensation voltage responsive thereto. The compensation voltage is then input into the chuck power supply in order to keep the currents supplied to the poles substantially equal but opposite in sign throughout the etch. In this embodiment, the compensation voltage is monitored for the aforementioned pattern indicative of *the end of the etch process* in order to terminate the etch.[2] (emphasis added)

The Office action bases the rejection on Fig. 3 of the reference. Fig. 3 is described in the specification as follows:

> FIG. 3 illustrates a typical compensation voltage as the etch progresses through the target layer. At point 302, the etch begins on compensation voltage plot 300. As the etch progress, the compensation voltage changes. Although the change is illustrated in FIG. 3 by an increasing compensation voltage, the compensation voltage may change in other ways, such as decreasing, as the etch progresses in other substrates. *As the etch clears the target layer, a significant change in the compensation voltage is typically observed.* Although the end of the etch is evidenced by a steep upward slope in the vicinity of region 304 in FIG. 3, the end of the etch may also be evidenced (in other etch processes) by a sharp downward slope, a spike or a sudden dip in the signal. Irrespective of the exact shape of the compensation voltage plot at the time the etch ends, *the end of the etch is typically evidenced by a clearly discernible change in the compensation voltage.* The specific characteristic shape of the compensation voltage plot at the time the etch ends may be ascertained by performing sample etches on sample wafers. Thereafter, the monitoring circuitry may be instructed to look for the ascertained characteristic shape in the compensation plot that signals the end of the etch for endpointing purposes.[3] (emphasis added)

It is clear that the Winniczek reference discloses a method in which the end of the etch process triggers the detection. The Winniczek reference thus fails to disclose "detecting a change of the voltage prior to the completion of the etching of the target layer of material", and therefore does not "describe all of the elements and limitations of the claim" as required by law.

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[2] US 6, 228,278 B1, col. 2, l. 49 – col. 3, l. 7.
[3] ib., col. 6, ll. 14-36.

Because the reference fails to disclose at least the element of detecting a change of the voltage prior to the completion of the etching, it can not be said to anticipate claim 12. Therefore claim 12 stands patentable over the reference.

Issue II. The 102(e) rejection against claims 13, 14, and 19 is improper because claims 13, 14, and 19 depend on a patentable claim 12 with further limits.

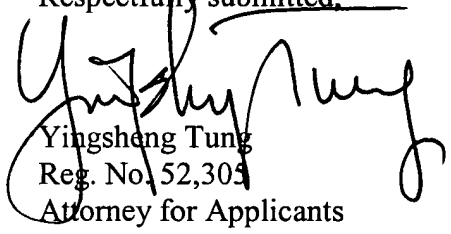
The 102(e) rejection is improper because the claims depend on claim 12, which is patentable over the Winniczek reference and each of claims 13, 14, and 19 discloses additional limits. In particular, claim 13 limits the measured element to a resistor; claim 14 further limits the voltage to a DC voltage; and claim 19 further limits the measured element to a part of an impedance matching network. Therefore, claims 13, 14, and 19 stand patentable over the reference.

Conclusion

The reference cited in the Office action fails to disclose all the elements in claim 12. Therefore the 102(e) rejection is improper and claim 12 stands patentable over the reference. The dependent claims 13, 14, and 19 depend on claim 12 with additional elements. Therefore, claims 12, 13, 14, and 19 stand patentable over the cited reference.

Applicants respectfully request the final rejection be withdrawn and the claims pass to issuance.

Respectfully submitted,



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